

THAT WHICH IS CLAIMED:

1. A machined structural assembly prepared by the process comprising the steps of:

determining the dimensions of the machined structural assembly;

5 selecting first and second structural members based on the dimensions of the machined structural assembly;

friction welding the first and second structural members together to construct a preform such that the preform has dimensions approximating the dimensions of the machined structural assembly; and

10 thereafter, machining the preform to remove excess material from the preform to form the machined structural assembly having the predetermined dimensions.

2. A machined structural assembly according to Claim 1 wherein said friction welding step comprises:

moving at least one of the first and second structural members relative to the other;

15 concurrently with said moving step, urging at least one of the first and second structural members toward the other to thereby generate frictional heat about the at least two contact surfaces;

terminating said moving step; and

20 concurrently with said terminating step, urging at least one of the first and second structural members toward the other as the at least two contact surfaces cool to thereby form a friction weld joint at least partially between the at least two contact surfaces.

3. A machined structural assembly according to Claim 2 wherein said moving step comprises oscillating at least one of the first and second structural members relative to the other structural member.

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4. A machined structural assembly according to Claim 2 wherein said moving step comprises simultaneously moving the first and second structural members in opposing directions, wherein the opposing directions are parallel to the at least two contact surfaces.

5 5. A machined structural assembly according to Claim 1 further comprising forming a relief groove proximate to at least one of the at least two contact surfaces before said positioning step.

6. A machined structural assembly according to Claim 1 further comprising cleaning at least one of the at least two contact surfaces prior to said
10 positioning step.

7. A machined structural assembly according to Claim 1 wherein said machining step comprises machining the friction weld joint joining the first and second structural assembly.

8. A machined structural assembly according to Claim 1 further
15 comprising processing at least one of the first and second structural members before said friction welding step, wherein said processing step comprises a material treatment selected from the group consisting of heat treating, aging, quenching, stretching, annealing, and solution annealing.

9. A machined structural assembly according to Claim 1 further
20 comprising processing the preform before said machining step, wherein said processing step comprises a material treatment selected from the group consisting of heat treating, aging, quenching, stretching, annealing, and solution annealing.

10. A machined structural assembly according to Claim 1 further
25 comprising friction welding a third structural member to at least one of the first and second structural members.